Claims

[1] A rotor for generating vortex water flow, comprising:
a plurality of first blades extended in a radial direction from a rotational axis thereof; and
a plurality of second blades extended in the radial direction from the rotational axis, and disposed at positions different from positions of the first blades in a direction of the rotational axis.

[2] The rotor as claimed in claim 1, wherein the first blades and the second blades have widths different from each other in a circumferential direction around the rotational axis.

[3] The rotor as claimed in claim 2, wherein the first blades and the second blades are so disposed as to be overlapped with each other.

[4] The rotor as claimed in claim 1, wherein the first blades and the second blades are disposed at positions different from each other in a circumferential direction around the rotational axis.

[5] The rotor as claimed in claim 4, wherein the first blades and the second blades are partially overlapped with each other.

[6] The rotor as claimed in claim 4, wherein the first blades and the second blades are distanced from each other in the circumferential direction.

[7] The rotor as claimed in claim 6, wherein the first blades and the second blades are so disposed as to be distanced equally from each other in the circumferential direction.

[8] The rotor as claimed in claim 4, further comprising at least one of protrusion attached on outer surfaces of the first blades and/or second blades.

[9] The rotor as claimed in claim 8, wherein the protrusion is so formed as to have width varying in the circumferential direction.

[10] The rotor as claimed in claim 9, wherein the protrusion is so formed as to have streamlined width in the circumferential direction.

[11] The rotor as claimed in claim 10, wherein the protrusion is so formed as to have a rear shape curved rearward in the circumferential direction.

[12] The rotor as claimed in claim 9, wherein the protrusion is so formed as to have a horizontal cross section of circle shape substantially.

[13] The rotor as claimed in claim 7, wherein a plurality of protrusions are respectively attached between the first blades and the second blades, and sizes of the protrusions become greater gradually in the radial direction.

[14] The rotor as claimed in claim 4, wherein the first blades and the second blades have widths same with each other in the circumferential direction.

[15] The rotor as claimed in claim 4, wherein the first blades and the second blades are disposed alternately in the circumferential direction.

[16] The rotor as claimed in claim 1, wherein the first blades and the second blades are disposed so that at least a part thereof are overlapped with each other in the rotational axis direction and are disposed so as to be distanced from each other in a circumferential direction around the rotational axis, and
at least one of protrusion is disposed between the first blades and the second blades.

[17] The rotor as claimed in claim 16, wherein the protrusion is so formed as to have width varying in the circumferential direction.

[18] The rotor as claimed in claim 17, wherein the protrusion is so formed as to have streamlined width in the circumferential direction.

[19] The rotor as claimed in claim 18, wherein the protrusion is so formed as to have a rear shape curved rearward in the circumferential direction.

[20] The rotor as claimed in claim 17, wherein the protrusion is so formed as to have a horizontal cross section of circle shape substantially.

[21] The rotor as claimed in claim 16, wherein a plurality of protrusions are respectively attached between the first blades and the second blades, and sizes of the protrusions become greater gradually in the radial direction.

[22] The rotor as claimed in claim 1, further comprising:
a first ring formed integrally with the first blades and disposed coaxially with the rotational axis; and
a second ring formed integrally with the second blades and disposed coaxially with the rotational axis.

[23] The rotor as claimed in claim 22, wherein the first ring and the second ring have radiuses different from each other.

[24] The rotor as claimed in claim 1, further comprising a first rotor equipped with the first blades, and a second rotor equipped with the second blades;
wherein the first rotor and the second rotor are attached to each other.

[25] The rotor as claimed in claim 1, further comprising a first rotor equipped with the first blades, and a second rotor equipped with the second blades;
wherein the first rotor and the second rotor are formed in a body.

[26] A filtering apparatus comprising:
a barrel having a water inflow port, a processed water discharge port, and a condensed water discharge port;
at least one of rotor disposed in the barrel and having a construction depicted in one of claims 1 through 25; and
at least one of filter tray disposed alternately with the rotors in the barrel.

[27] The filtering apparatus as claimed in claim 26, wherein the filter tray is fixed in the barrel.

[28] The filtering apparatus as claimed in claim 26, wherein the filter tray has at least one of water passage port so formed as to penetrate a plane thereof.

[29] The filtering apparatus as claimed in claim 28, wherein the filter tray includes a supporting plate having a disk shape, a drain cloth attached on both surface of the supporting plate, and a separation membrane attached to an outer surface of the drain cloth.

[30] The filtering apparatus as claimed in claim 29, wherein the drain cloth and the separation membrane are adhered onto the supporting plate with thermosetting adhesive.